(No Model.) 5 Sheets—Sheet 1.

A. BLOMFELDT.

FOLDING MACHINE.

No. 589,068. Patented Aug. 31, 1897.

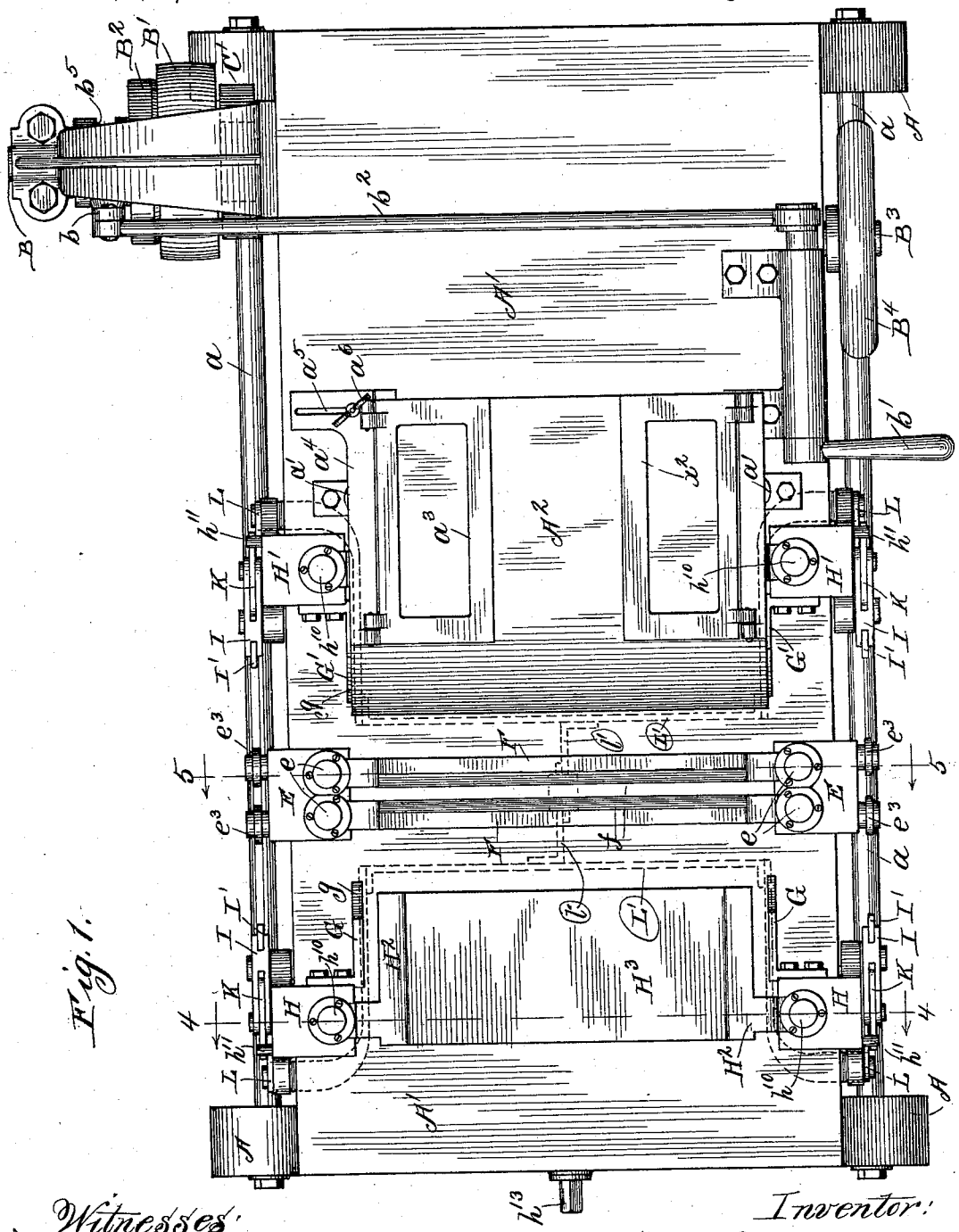


Fig. 1.

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E. A. Duggan.

Inventor:
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By Chas. C. Tillman.
Atty.

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(No Model.) 5 Sheets—Sheet 2.

A. BLOMFELDT.

FOLDING MACHINE.

No. 589,068. Patented Aug. 31, 1897.

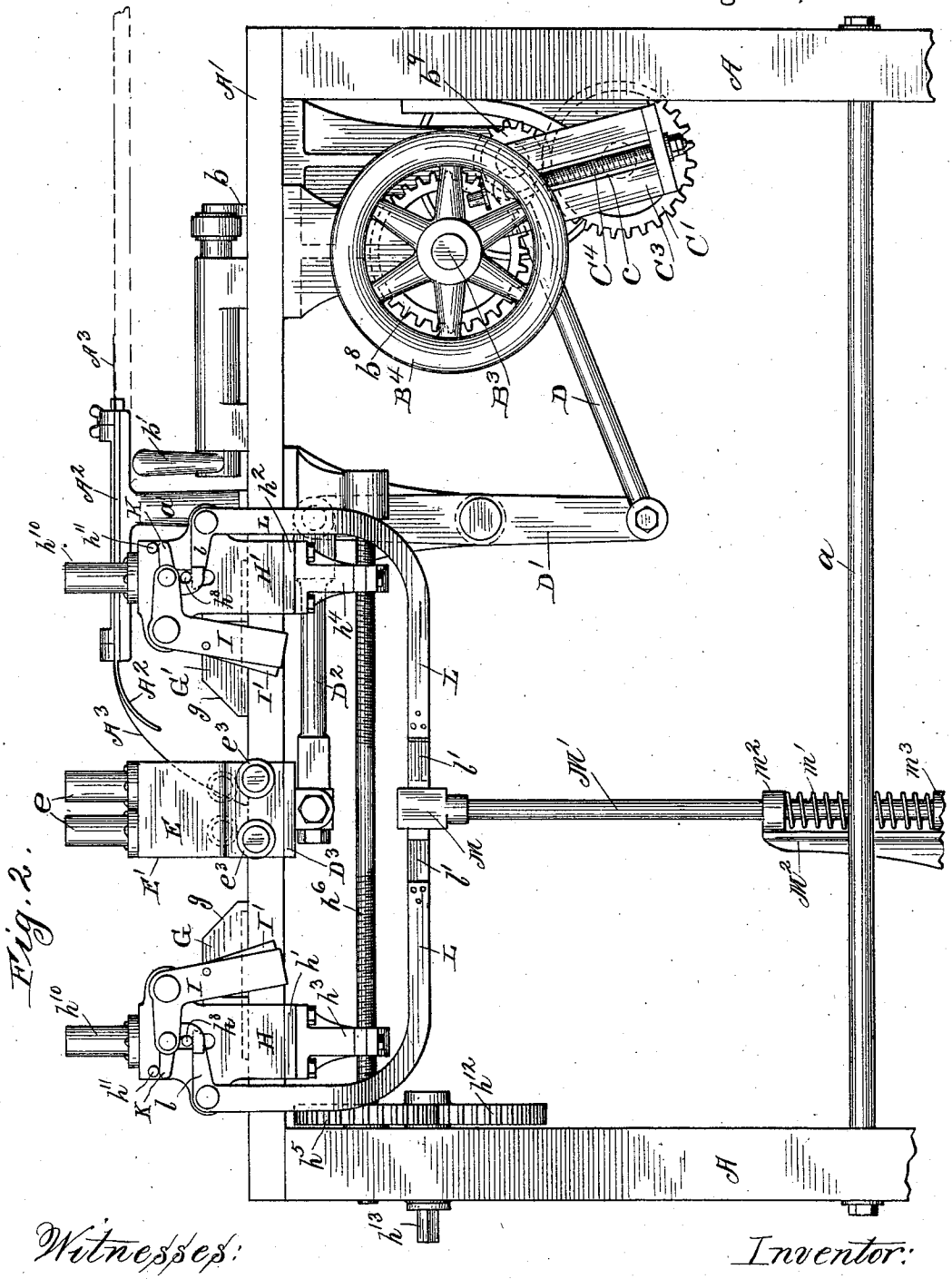


Fig. 2.

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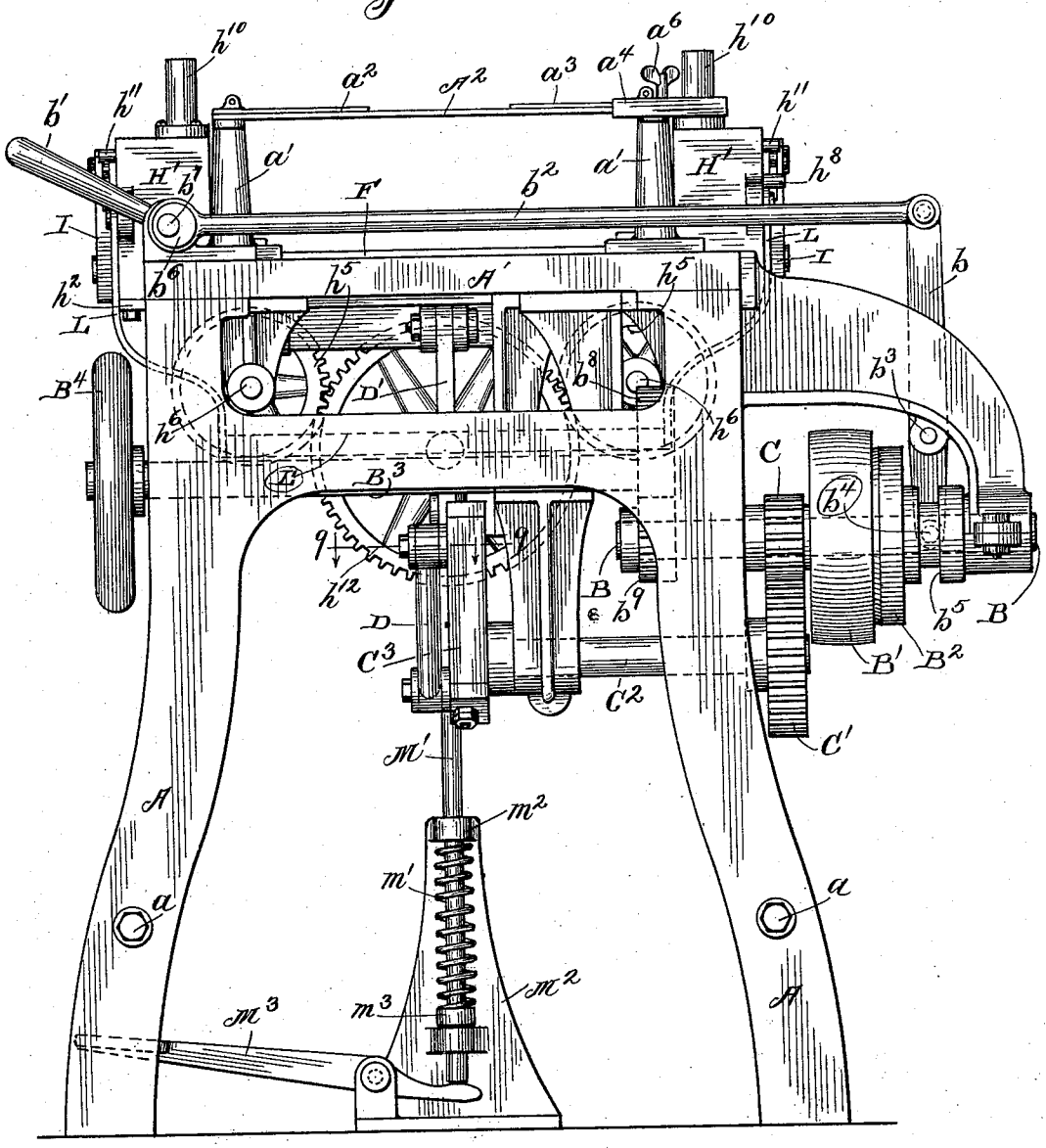
(No Model.) 5 Sheets—Sheet 3.

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FOLDING MACHINE.

No. 589,068. Patented Aug. 31, 1897.

Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

A. BLOMFELDT.

FOLDING MACHINE.

No. 589,068. Patented Aug. 31, 1897.

Fig 4.

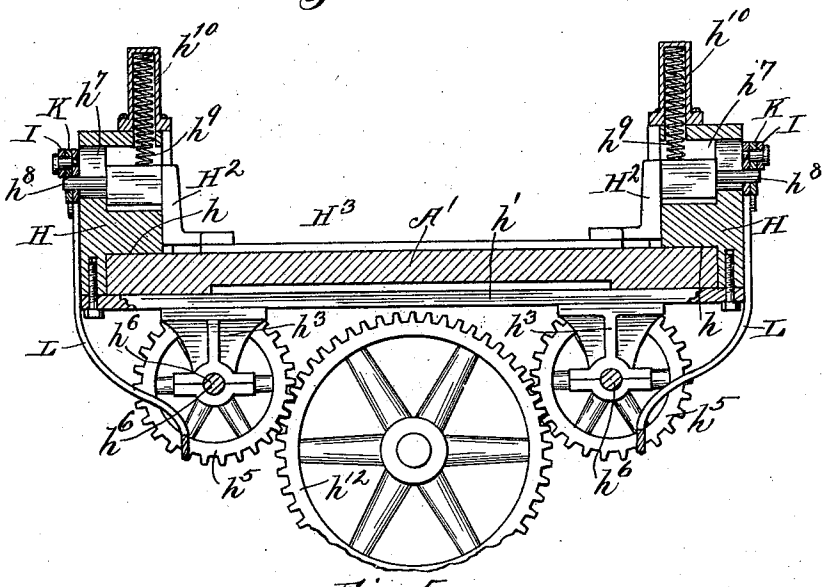


Fig. 5.

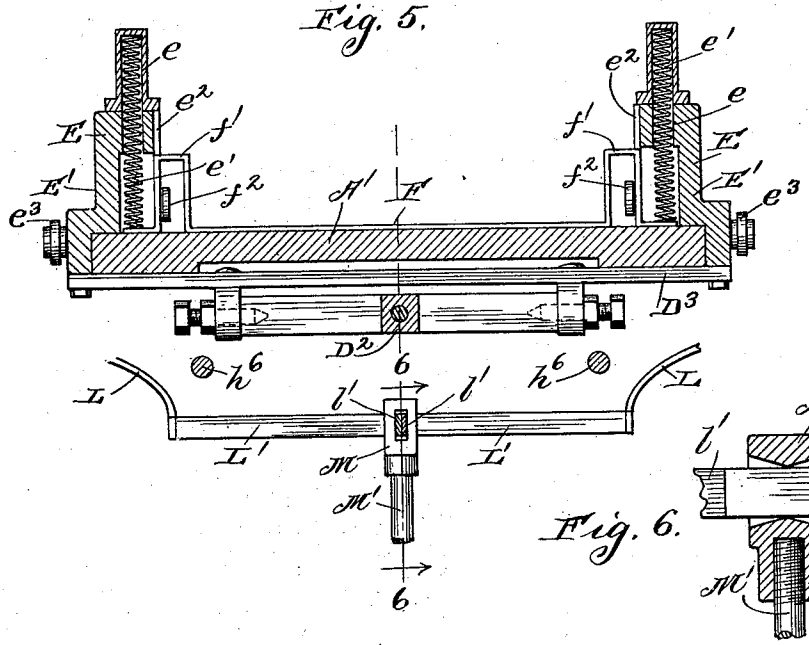
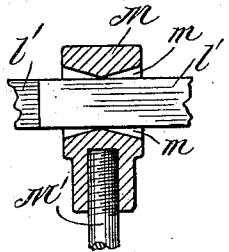


Fig. 6.



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(No Model.) 5 Sheets—Sheet 5.

A. BLOMFELDT.

FOLDING MACHINE.

No. 589,068. Patented Aug. 31, 1897.

Fig. 7.

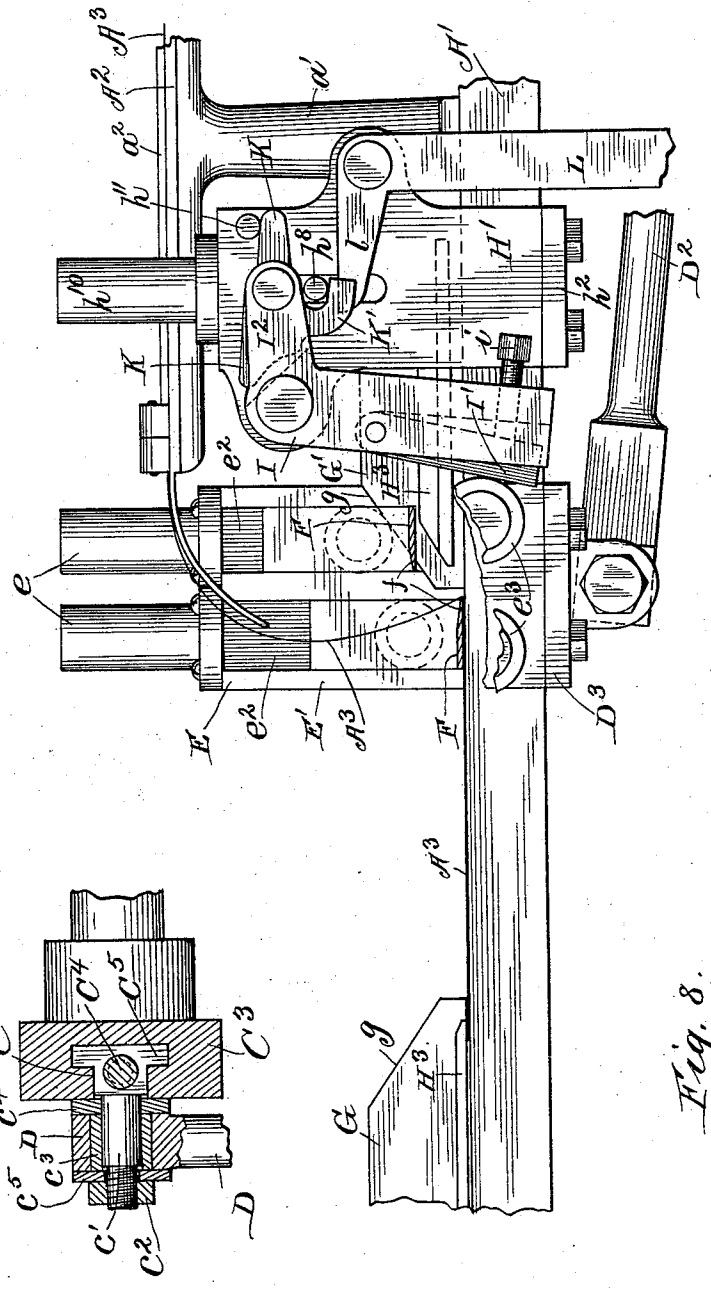


Fig. 9.

Fig. 8.



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UNITED STATES PATENT OFFICE.

AXEL BLOMFELDT, OF CHICAGO, ILLINOIS.

FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,068, dated August 31, 1897.

Application filed January 11, 1897. Serial No. 618,844. (No model.)

To all whom it may concern:

Be it known that I, AXEL BLOMFELDT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

This invention relates to that class of folding-machines which operates to impart transverse folds to sheets of material passing through it, and while it is more especially designed and intended to be used for folding railroad mileage-tickets, which are of considerable length, yet it is applicable for folding other sheets; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal objects of my invention are to provide an improved folder of the above-named class whereby the material may be formed into numerous folds or layers and to locate said folds at the proper points, so as to produce a package of convenient size and form and so that the creases or folds will not interfere with the printed matter or inscriptions which may be on the material being folded.

Other objects and advantages will appear in the description hereinafter set forth.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a plan view of the machine. Fig. 2 is a view in side elevation of the front or operating side, showing the lower part of the main or supporting frame broken away. Fig. 3 is an end view in elevation. Fig. 4 is a cross-sectional view, partly in elevation, taken on line 4 4 of Fig. 1, showing the bed-plate and one of the retaining jaws or pieces and the mechanism for adjusting it on the bed-plate or main frame. Fig. 5 is a similar view taken on line 5 5 of Fig. 1, showing one pair of the carriers or travelers provided with a folding or creasing blade and a fragment of one of the levers employed for raising the retaining-jaws. Fig. 6 is an enlarged sectional view, taken on line 6 6 of Fig. 5, looking in the direction of the arrow, showing the manner of movably securing the connecting-bars of the levers for lifting the retaining-jaws on the upper part of the lifting-post. Fig. 7 is an enlarged view in elevation of a part of the bed-plate or top of the main frame, showing the delivery-platform mounted thereon, one of the retaining-jaws, and the mechanism for operating the same, and illustrating a part of the folding or creasing blades, carriers, or travelers in a different position from that shown in Figs. 1 and 2 and about in the act of forcing the sheet of material to be folded under one of the retaining-jaws. Fig. 8 is a detail edge view of the sheet of material after it has been folded; and Fig. 9 is an enlarged sectional view taken on line 9 9 of Fig. 3, looking in the direction indicated by the arrows.

Similar letters refer to like parts throughout the different views of the drawings.

A represents the main or supporting frame, which is braced near its lower portion by means of tie-rods a and is provided at its upper part with a top or bed plate A′, upon which is mounted on suitable supports a' a delivery-platform A^2 for the support and guidance of the sheet or ticket A^3 which is to be folded. On its upper surface and near its side edges the platform A^2 is provided with holding-plates a^2 and a^3, the former of which is hinged at its outer edge on the platform, while the latter is hinged to an adjustable piece a^4, which is provided with a slot a^5 to receive a set-screw a^6, which engages the delivery-platform or support therefor and is employed to secure the adjustable piece at the desired position, which piece may be adjusted inwardly or outwardly to accommodate the width of the ticket or sheet to which the folds are to be imparted and in conjunction with the holding-plates a^2 and a^3 will guide the ticket or sheet and hold it taut.

In suitable bearings and near one end of the main frame is journaled a main or driving shaft B, upon which is loosely mounted a pulley B′, to which power is applied by means of a belt, (not shown,) and which pulley may be fixed on the shaft by means of a clutch B^2, located on said shaft and adapted to be thrown

into engagement with the pulley through the medium of the levers b and b', which are connected by means of a rod b^2, as shown in Figs. 1 and 3 of the drawings. The lever b is fulcrumed, as at b^3, on a bracket of the main frame and is provided at its lower end with a roller or projection b^4, which extends into an annular groove b^5 on the clutch.

To the upper end of the lever b is pivotally connected the rod b^2, which is provided at its other end with an eccentric b^6, located on the fulcrum b^7 of the hand-lever b', by the raising or lowering of which the clutch will be engaged or disengaged from the pulley, as is apparent. On the shaft B is also located a cogged gear C, which meshes with a similar gear C' on the shaft C^2, which is journaled on the main frame and has secured on its inner end a block C^3, as shown in Figs. 2 and 9, for the reception of a screw-rod C^4, used to regulate the stroke of the carriers for the folding or creasing blades, as will be presently explained.

The screw-rod C^4 extends through and is secured in the ends of the block C^3 and has thereon a screw-threaded nut C^5, located in the groove c, and is provided with an extension c', the end of which is screw-threaded to engage a nut c^2. On the extension c' is a collar c^3 and a washer c^4 adjacent to the block, and movably secured on the collar c^3 is one end of the pitman D, whose other end is pivotally connected to the lower end of a lever D', fulcrumed on the main frame. On the extension c' of the nut C^5 is a washer c^5, which contacts with the outer portion of the collar c^3 and is held in position by means of the nut c^2 on said extension or arm.

Pivotally secured at one of its ends to the upper end of the lever D' is a pitman D^2, whose other end is pivotally secured on a cross-bar D^3, located beneath the bed-plate A' or top of the main frame and uniting the lower portions of the folding or creasing blade carriers E, which are movably located on the sides of the bed-plate.

Each of the carriers E consist of an upright piece E', each provided with two vertical openings or chambers e for the reception and operation of springs e', whose lower ends are secured to the ends of the folding or creasing blades F, which extend parallel with one another across the top of the bed-plate and from one carrier to the other and have their adjacent edges downwardly beveled, as shown at f in Figs. 1 and 7 of the drawings. Each of these blades are formed near their ends with upward bends f', usually rectangular in shape, and extend into the vertical openings or chambers e of the carriers to engage the springs e', which normally hold them in a lowered position. The outer portion of the bends f' of the blades fit and operate in vertical grooves e^2 on the adjacent surfaces of the carriers and are vertically guided thereby.

Journaled in each of the bends f' of the blades F is a roller f^2, which contact in the movement of the carriers with the side pieces G and G', whose adjacent ends are beveled, as at g, to cause the rollers on each blade to alternately rise thereon.

As shown in Figs. 1 and 7 of the drawings, the side pieces or rails G and G' are secured to the blocks H and H', respectively, which are located in pairs on the side edges of the bed-plate and at the proper distance apart to allow of the movement or stroke of the carriers E, which are located between said blocks. Each of these blocks are of similar construction and are formed with a recess h in their lower part, within which fits the bed-plate A', and are joined together in pairs at their lower ends by means of cross-bars h' and h^2, which are provided with hangers or bearings h^3 and h^4 for the screw-threaded rods h^6, on and near one end of each of which is located a gear h, and which rods are employed for regulating the position of said blocks. The upper portion of each of the blocks H and H' is provided with a vertical slot or recess h^7, extending therethrough and transversely to the bed-plate for the reception of an angular foot H^2, provided with a pin or projection h^8 on its outer part, which feet are normally held in a lowered position by means of springs h^9, located in suitable chambers h^{10} on the top of the blocks. Extending across the top of the bed-plate and connecting the feet in pairs is a retaining-jaw H^3, which is lifted to allow the ends of the ticket or sheet of material being folded to be placed thereunder.

Fulcrumed to the outer surface of each of the blocks H and H' is a bell-crank lever I, each of which is provided with a protecting-piece I', which is pivotally secured at its upper end to the said lever and is adjusted by means of a set-screw i, located in each of the levers near its lower end. To the upper end or arm of each of the levers I, and between said arm and the outer surface of the block to which the lever I is fulcrumed, is pivotally secured an engaging and releasing cam K, which is formed with two prongs k and k', the former to engage a pin h^{11} on the outer surface of the block and the latter to engage the projection h^8 of the foot H^2, which, as before stated, is secured to the retaining-jaw.

Fulcrumed on the outer surface of the blocks H and H' are levers L, whose upper ends or arms l extend under the projections h^8 of the feet H^2. These levers are curved so as to extend under the bed-plate or top of the main frame, and are connected transversely with the bed-plate in pairs by means of cross-bars L', which cross-bars have secured at their middle and at right angles thereto arms l', which pass through an opening m in the head-piece M, secured on the lifting-post M', which is supported by means of a bracket M^2, on which is fulcrumed a foot-lever M^3, whose inner end projects under the lower ends of the lifting-post, which is normally held in a lowered position by means of a spring m', encircling the post, and whose

upper end rests against a collar m^2 of the bracket M^2 and the lower end against an annular enlargement m^3 on the post.

In order to adjust the blocks H and H′, the rods h^6, which are provided with right and left screw-threads, as shown in Fig. 2, are passed through screw-threaded openings in the hangers h^3 and h^4, and are turned by means of the gear h^{12}, which is journaled on the main frame and is provided with a projection h^{13} to receive a crank-handle or wrench for operating the same. As the blocks H and H′ are thus adjusted with respect to one another, it is apparent that the arms l', which pass through the opening m in the headpiece M, will be free to move longitudinally in said opening, yet will be in position to lift the levers L when desired.

On the outer surface of each of the carriers E and near their lower ends are journaled two rollers e^3, which contact with the pivoted pieces I′ on the bell-crank levers when said pieces are employed, (or if they are omitted with the said levers.)

Journaled transversely on the main frame and near the main or driving-shaft B is a shaft B^3, which is provided on its end adjacent to the driving-shaft with a gear b^8, which meshes with a gear b^9 on the main shaft. On the other end of the shaft B^3 is a hand-wheel B^4, which is used for turning the shaft B^3, and through it the main shaft, when it is desired to "set" the carriers at the desired position.

From the foregoing and by reference to the drawings it will be seen and clearly understood that by extending the sheet or ticket A^3 from the delivery-platform A^2 between the blades F and placing the free end thereof under one of the jaws H^3, which may be raised to receive the end of the ticket by pressing on the foot-lever M^3, which forces the lifting-post M′ upward, and through it the arms l' on the levers L, which engage the projections h^8 on the feet H^2, to which the jaws are secured. By removing the pressure from the foot-lever the jaws will descend and one of them hold a sheet between it and the bed-plate, when power may be applied to the driving-shaft, which will cause the carriers E, bearing the folding-blades F, to move toward the blocks H′, in which operation the rollers f^2 adjacent to said blocks will contact with the beveled portions g of the side pieces or rails G′ and will travel and rise thereon, thus lifting the blade next to the blocks H′ over the jaw H^3, at which instant the rollers e^3 adjacent to the blocks H′ will impinge the lower portion of the bell-crank levers I and force them outwardly, thus raising the arms I^2, and thereby causing the cams K, pivoted on said arms, to lift the jaw H^3 by means of the feet H^2 and their projections h^8, when the lowered folding-blade will force the sheet under the jaw, which at this instant will be tripped by reason of the lower arms k' of the cams being removed from under the projections h^8, which is accomplished by the arms k contacting with the pins h^{11}, which causes the cams to turn on their pivots, as is apparent. Just as the jaw descends on the ticket or sheet the carriers E will begin their reverse movement, and the blade, which has just been raised, will be lowered by reason of the springs e' and the incline g of the side pieces G′ and will press the sheet on the lower layer thereof until the rollers f^2 adjacent to the blocks H strike the side pieces G, when the same operation as just above described will occur.

It is apparent that by lowering the hand-lever b' the clutch B^2 will be disengaged from the pulley B′, which is loosely mounted on the driving-shaft, and the operation of the machine thus stopped. As the bell-crank levers I may become worn by continuous impingement with the rollers e^3 on the carriers, I may provide each of said levers with a piece I′, which is pivoted at its upper end in a slot in the face of the lever and is extended or retracted in said slot by means of a set-screw i, located in the lower portion of the lever.

To regulate the stroke of the folding or creasing blades, the screw-rod C^4 may be turned so as to force the pitman D, which is connected to said screw-rod, as above set forth, either up or down thereon, as may be required, which adjustment will produce the desired result.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a main or supporting frame provided with a top or bed plate, of two pairs of blocks located thereon, a retaining-jaw extending across the bed-plate and secured in the blocks of each pair but having a vertical movement therein, a lever fulcrumed on each of the blocks and having a connection at one of its ends with the retaining-jaw, a cross-bar uniting the other ends of the levers beneath the bed-plate, a lifting-post movably connected to said cross-bars and a foot-lever adapted to lift said post, substantially as described.

2. The combination with a main or supporting frame provided with a top or bed plate, of the blocks H, and H′, located thereon, each having the vertical opening h^7, the retaining-jaws H^3, located between the blocks and across the bed-plate, the spring-actuated feet H^2, provided with the projections h^8, secured to the said jaws and located in the openings of the blocks, the levers L, fulcrumed on the blocks and engaging at one of their ends with the projections h^8, the cross-bars L′, uniting the other ends of the levers in pairs, the lifting-rod M′, movably connected to said cross-bars, and a foot-lever to lift said post, substantially as described.

3. The combination with a main or supporting frame provided with a top or bed plate, of the blocks H, and H′, having the vertical openings h^7, the retaining-jaws H^3, located between

the blocks and across the bed-plate, the spring-actuated feet H^2, provided with the projections h^8, secured to the said jaws and located in said openings of the blocks, the bell-cranks I, fulcrumed on the blocks, the cams K, pivoted on the upper arm of the bell-crank levers and having the prongs k, and k', adapted to lift and release the jaws through the projections h^8, substantially as described.

4. The combination with a main or supporting frame provided with a top or bed plate, of the blocks H, and H', provided with the side pieces G, and G', respectively, and having the vertical openings h^7, the retaining-jaws H^3, located between the blocks and across the bed-plate, the spring-actuated feet H^2, provided with the projections h^8, secured to the said jaws and located in said openings of the blocks, the bell-cranks I, fulcrumed on the blocks, the cams K, pivoted on the upper arm of the bell-crank levers and having the prongs k, and k', adapted to lift and release the jaws through the projections h^8, the carriers E, mounted on the bed-plate between the blocks H, and H', two parallel blades extending across the bed-plate and connected to the carriers and having a vertical movement therein, the rollers e^8, journaled on the outer surface of the carriers and adapted to impinge the lower part of the bell-crank levers, the rollers f^2, journaled on the said blades and adapted to contact with the rails G, and G', and a mechanism to impart a reciprocating movement to the carriers, and a vertical movement to the blades and retaining-jaws, substantially as described.

5. The combination with a main or supporting frame, provided with a top or bed plate, of the carriers E, mounted on the bed-plate at its edges and each provided with vertical openings and grooves for the reception and operation of two parallel blades, said blades extending across the bed-plate and having at their ends upward bends fitting in the grooves of the carriers, springs within said vertical openings and secured to the ends of the blades, rollers journaled on the bent portions of the blades and adapted to contact with inclined surfaces to raise the blades, substantially as described.

Chicago, Illinois, December 16, 1896.

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